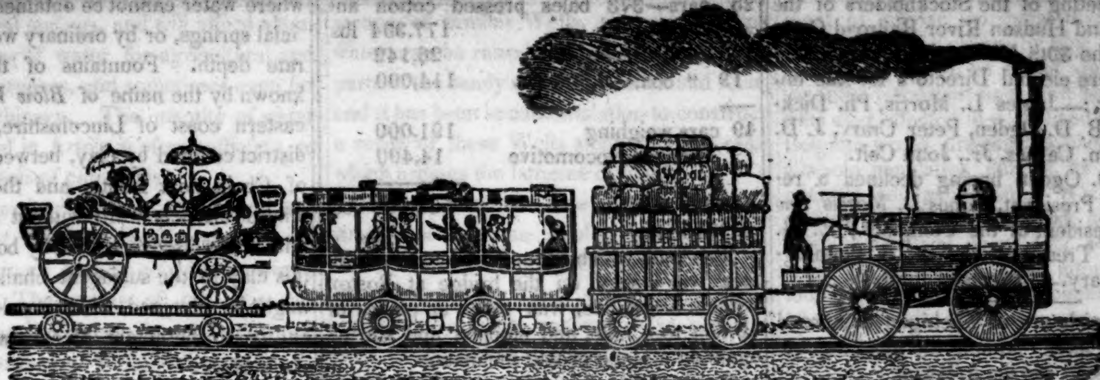

AMERICAN RAILROAD JOURNAL,

AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT NO. 30 WALL STREET, NEW-YORK, AT FIVE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

D. K. MINOR, and GEORGE C. SCHAEFFER, } EDITORS AND PRORIETORS.] SATURDAY, APRIL 22, 1837. [VOLUME VI.—No. 16.

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, APRIL 22, 1837.

REMOVAL.—The Office of the RAILROAD JOURNAL, NEW-YORK FARMER, and MECHANIC'S MAGAZINE, is removed to No. 30 WALL-STREET, *basement story*, one door from William street, and *opposite the Bank of America.*

ENLARGEMENT OF THE ERIE CANAL.—The country on the Upper Lakes, whose trade is chiefly with the city of New-York, is but beginning to be settled, yet the Erie Canal is so crowded as to retard the progress of boats. The exports and imports of Michigan, for example, have probably more than doubled within the last eighteen months, and are still, in all human probability, less than one-third of what they will be three or four years hence. The same is true of the contiguous portions of Indiana, Illinois and Wisconsin. The commerce of the northern part of Ohio is still rapidly increasing, and that of Western New York is far, very far from the ultimate limit of its expansion. By what means of conveyance is the produce of these immense regions to reach New-York, and how are the manufactures of the Eastern States and Europe to be brought to us? Have the great importing merchants of New-York reflected, that the consumption in this North Western country of the products of Europe, of Asia, of the West Indies, will give employment to twice their present amount of shipping? Through what channel are we to receive these products, and which of the Atlantic cities will supply us? It is very certain that New-York cannot without either enlarging the Erie Canal, or building another, or both.

Those who ask for the enlargement of the Erie Canal, do not ask the State of New-York to spend one cent in the accomplishment of that object. The tolls will pay the interest on the requisite loans, and in 20 years, create a sinking fund sufficient to pay the principal. Michigan and Wisconsin, Illinois and Indiana will pay all the expenses, in the tolls on our merchandise. The Legislature of New-York has but to *will* the accomplishment of the work, and it will go on without expense. Loans to any requisite amount can be made on the credit of the tolls—endorsed by the State—which endorsement would subject the State to no manner of risk. The commerce of an immense and wealthy region, and the inevitable course of events, are pledged to pay for the improvement.

When the Pittsburgh and Erie, and Pittsburgh and Cleaveland Railroads connecting us with Philadelphia and Baltimore, are completed, a considerable portion of our trade will be with those cities. Four years hence, the country of the Upper Lakes can trade, to the amount of a good many millions, with Baltimore and Philadelphia, and at the same time double its present business with New-York.

We are sceptical as to railroads being the best vehicles for the transportation of heavy produce—though they may do well, still, we believe, canals will do better. We therefore think that *if the Erie Canal is enlarged*, New-York will still have the advantage in the competition with Philadelphia and Baltimore, for the trade of the North West; otherwise, not.—[Detroit Jour. and Cour.]

At a meeting of the Stockholders of the Paterson and Hudson River Railroad Company, on the 30th March ult., the following persons were elected Directors for the ensuing year:—James L. Morris, Ph. Dickerson. E. B. D. Ogden, Peter Crary, J. D. Beers, Wm. Carnes, Jr., John Colt.

E. B. D. Ogden having declined a reelection as President, James L. Morris was elected President of the Company; E. B. D. Ogden, Treasurer, and A. S. Pennington, Secretary.—[Paterson Intel.]

The Legislature of Michigan adjourned on the 21st inst. Among the most important acts passed are the following:

The General Banking Law.

An act to provide for the appointment of a board of Commissioners of Internal improvement.

An act to authorise the construction of certain works of Internal Improvement.

An act authorising a loan of five million dollars for the construction of works of Internal Improvement.

The act for the organization and support of Primary Schools.

The act to organize the University of the State of Michigan.

The act providing for a geological Survey.—[Buffalo Daily Com. Adv.]

We find the following, among other toasts, which were drank at the late celebration of St. Patrick's Day, at Pittsburgh:

By H. H. Van Amringe.—Education. The great Railroad of *internal* improvement; may the main line and the branches be extended and continued, until it pervades all the ends of the earth, and brings the Nations as one Family, to the great Author and universal Centre of truth, liberty, peace and happiness.

Seizure of a Railway.—Yesterday, at 2 o'clock, Mr. Macintosh, the contractor for this and many other public works, who claims a large sum as due to him from the London and Greenwich Railway Company, for the excavations and buildings executed by him thereon, took possession, by virtue of an execution, of the whole work, from London-bridge to Deptford, including the buildings, iron-rails, and steam-carriages, with every fixture, moveable, and other appurtenance. The clerks, money-takers, gate-keepers, engineers, conductors, constables, and other officers belonging to the establishment, were not a little astonished when they were informed by the officers of the sheriff that "their occupation was gone." Remonstrance, however, was vain; their respective departments were speedily filled up by persons in the employ of the new possessor. The claim of Mr. Macintosh is reported to amount to £300,000.—[London Post.]

Experiment on the Lowell Railroad.—The Boston Post states that on Saturday, March 25th, an experiment was tried on the Boston and Lowell Railroad, with a new engine built at Lowell, for the Stonington road. The weight of the engine is about 10 tons.

A train of 49 burden cars was drawn from Boston, to the turnout in Woburn, a distance of 10 miles, in 51½ minutes. The load exclusive of engine was as follows:—

25 cars—373 bales pressed cotton and wool,	177,364 lbs.
195 " groceries, &c.	26,142
19 " coal—6,000 lbs.	114,000
49 cars weighing	191,000
Tender to locomotive	14,400
	522,906 lbs.

or 261 tons.

The load, which occupied a length of 820 feet, was started on the bridge at Boston without assistance, was taken up planes of 10 feet to a mile, and stopped and started again on a plane of that inclination.

On the 18th of January, the small engine 'Patrick' of nine tons weight, also built at Lowell, took a load of 35 cars, weighing in all 201 tons in 2 hours 14 minutes, from Boston to Lowell, 26 miles.

In both cases the experiment was made without any previous preparation, the engines, cars and rails, being in their usual working state.

Among recent scientific works, few have attracted so much attention, as Buckland's Bridgewater Treatise on Geology. Whether for the originality and forcible nature of the reasoning for the clear and neat diction, or for the elegant manner in which the work is published.

An edition has already appeared in this country, and from the fame of Prof. Buckland as a geologist, there is no doubt as to the rapid sale of the successive editions in this country and in Europe.

We have extracted the very clear and distinct description of the operation of Artesian Wells, for the benefit of our readers.

ARTESIAN WELLS.

FROM BUCKLAND'S BRIDGEWATER TREATISE—GEOLOGY AND MINERALOGY.

The name of Artesian Wells is applied to perpetually flowing artificial fountains, obtained by boring a small hole, through strata that are destitute of waters, into lower strata loaded with subterraneous sheets of this important fluid, which ascends by hydrostatic pressure, through pipes let down to conduct it to the surface. The is name derived from Artois (the ancient Artesium) where the practice of making such wells has for a long time extensively prevailed.*

Artesian Wells are most available, and of the greatest use, in low and level districts where water cannot be obtained from superficial springs, or by ordinary wells of moderate depth. Fountains of this kind are known by the name of *Blow Wells*, on the eastern coast of Lincolnshire, in the low district covered by clay, between the Wolds of Chalk near Louth, and the sea shore. These districts were without any springs, until it was discovered that by boring through this clay to the subjacent chalk, a fountain might be obtained, which would flow incessantly to the height of several feet above the surface.

In the Kings well at Sheerness, sunk in 1781 through the London clay, into sandy strata of the Plastic clay formation, to the depth of 330 feet, the water rushed up violently from the bottom, and rose within eight feet of the surface. (Phil. Trans. 1784.) In the years 1828 and 1829 two more perfect Artesian Wells were sunk nearly to the same depth in the dock yards at Portsmouth and Gosport.

Wells of this kind have now become frequent in the neighborhood of London, where perpetual Fountains are in some places obtained by deep perforations through the London clay, into porous beds of the Plastic clay formation, or into the Chalk.*

Important treatises upon the subject of Artesian Wells have lately been published by M. Hericart de Thury and M. Arago in France, and by M. Von Bruckmann in Germany. It appears that there are extensive districts in various parts of Europe, where, under certain conditions of geological structure, and at certain levels, artificial fountains will rise to the surface of strata which throw

* In common cases of Artesian Wells where a single pipe alone is used, if the boring penetrates a bed containing impure water; it is continued deeper until it arrives at another stratum containing pure water; the bottom of the pipe being plunged into this pure water, it ascends within it, and is conducted to the surface through whatever impurities may exist in the superior strata. The impure water, through which the boring may pass in its descent, being excluded by the pipe from mixing with the pure water ascending from below.

* One of the first Artesian Wells near London was that of Morland House on the north-west of Holland House, made in 1794, and descrbed in Phil. Trans London 1797. The water of this well was derived from sandy strata of the plastic clay formation, but so much obstruction by sand attends the admission of water to the pipes from this formation, that it is now generally found more convenient to pass lower through these sandy strata, and obtain water from the subjacent Chalk. Examples of wells that rise to the surface of the lowest tract of land on the West of London may be seen in the artesian fountain in front of the Episcopal palace at Fulham, and in the garden of the Horticultural Society. Many such fountains have been made in the town of Brentford, from which the water rises to the height of a few feet above the surface.

This height is found to diminish as the number of perpetually flowing fountains increases; and a general application of them would discharge the subjacent water so much more rapidly than it arrives through the interstices of the chalk, that fountains of this kind when numerous would cease to overflow, although the water within them would rise and maintain its level nearly at the surface of the land.

out no natural springs, and will afford abundant supplies of water for agricultural and domestic purposes, and sometimes even for moving machinery. The quantity of water thus obtained in Artois is often sufficient to turn the wheels of corn mills.

In the Tertiary basin of Perpignan and the Chalk of Tours, there are almost subterranean rivers having enormous upward pressure. The water of our Artesian Well in Roussillon, rises from 30 to 50 feet above the surface at Perpignan and Tours. M. Arago states that the water rushes up with so much force, that a Cannon Ball placed in the pipe of an Artesian Well is violently ejected by the ascending stream.

In some places application has been made to economical purposes, of the higher temperature of the water rising from great depths. In Wurtemburg Von Bruckmann has applied the warm water of Artesian Wells to heat a paper manufactory at Heilbrown, and to prevent the freezing of common water around his mill wheels. The same practice is also adopted in Alsace, and at Constadt near the Stutgardt. It has even been proposed to apply the heat of ascending springs to the warming of green houses. Artesian Wells have long been used in Italy, in the duchy of Modena; they have also been successfully applied in Holland, China,* and North America—By means of similar Wells, it is probable that water may be raised to the surface of many parts of the sandy deserts of Africa and Asia, and it has been in contemplation to construct a series of these Wells along the main road which crosses the Isthmus of Suez.

I felt it important thus to enter into the theory of Artesian Wells, because their more frequent adoption will add to the facilities of supplying fresh water in many regions of the earth, particularly in low and level districts, where this prime necessary of life is inaccessible by any other means; and because the theory of their mode of operation explain one of the most important and most common contrivances in the subterraneous economy of the Globe, for the production of natural springs.

* An economical and easy mode of sinking Artesian Wells and boring for coal, &c. has recently been practised near Saarbirch. by M. Sellow. Instead of the tardy and costly process of boring with a number of iron rods screwed to each other, one heavy bar of cast iron about six feet long and four inches in diameter, armed at its lower end with a cutting chisel, and surrounded by a hollow chamber, to receive through valves, and bring up the chips of the perforated stratum, is suspended from the end of a strong rope, which passes over a wheel or pully fixed above the spot in which the hole is made. As the rope is raised up and down over the wheel its action gives to the bar of iron, a circular motion, sufficient to vary the place of the cutting chisel at each descent.

When the chamber is full, the whole apparatus is raised quickly to the surface to be unloaded, and is again let down by the action of the same wheel. This process has been long practised in China, from whence the report of its use has been brought to Europe. The Chinese are said to have bored in this manner to the depth of 1000 feet—M. Sellow has with this instrument lately made perforation 18 inches in diameter and several hundred feet deep, for the purpose of ventilating coal mines at Saarbirch. The general substitution of this method for the costly process of boring with rods of iron, may be of much public importance, especially when water can only be obtained from great depths.

Mode of supporting the Poor in Belgium.—Viscount Vilain XIII, who has been long appointed Minister at Rome, has resigned his office as Governor of East Flanders. Before quitting Ghent, Viscount Vilain addressed a circular to the different functionaries under his government, in which are some interesting details relating to the operations of the charitable workshops (*ateliers de charite*), established in different parts of Flanders. He states that the number of these institutions amounts to forty-three; that the total prime cost of material and salary paid to the poor amounts to 176.378 francs, and the same of manufactured articles to 162.583 francs, leaving a loss upon the whole of only 13,804 francs. Thus, at the expense of 13,804 francs, provision and employment have been given to 2265 poor people during the whole of the winter and part of the spring; and thus, at the trifling expense of six francs per person, forty-three parishes have been rescued from the evils of mendicity, and a large body of poor creatures, who must otherwise have begged or starved, have been actively and usefully employed, and have had the means of supporting their families without other parochial relief. The letter adds, that the average loss of six francs only arises from defective administration in some of the parishes, since it results that, in twenty-five out of forty-three, the loss has not exceeded two francs, and indeed in some of these has not been more than eighty centimes per person. In seven parishes the receipts nearly balance the expense, so that the poor have cost little or nothing; and in four parishes the returns have exceeded the expense, so as to leave a balance in the hands of the directors after supporting all the poor. These are remarkable results, and are well worthy the attention of the philanthropists in England and Ireland; for what can be more praiseworthy, more advantageous or honorable to the community, than the establishment of institutions by which pauperism, idleness, and immorality are neutralized without expense, and by which a number of persons who would be otherwise thrown upon the public workhouse, or become burdens to the parish, are actively employed, and encouraged in habits of industry and economy? Viscount Vilain earnestly recommends the establishment of similar worshops throughout the whole country. Were he able to effect his benevolent object, he would obtain one of the most important and most beneficial results ever effected in a civilized nation; and Belgium would present the phenomenon of a whole population purged, as it were, of idleness and pauperism. Whilst upon the subject, it may be observed, according to official statistical documents, published by order of the minister of the interior, that the total gross amount of the revenue of hospitals, charitable establishments, and of the divers sums expended upon the poor, amounted, in 1833, to 11,647,000 francs, or about 285 francs per individual. The number of the poor in the provincial workhouses has been reduced from 3454 in 1827, to 2662 in 1833, a remarkable diminution, seeing that the population has increased in an inverse ratio, having augmented from 3,800,000 in 1827, to 4,061,000 in 1833. The same document states, that the total number of persons receiving instruction at the various colleges, schools, and places of education of all denominations, amounted altogether to 353,342 in 1826, whereas in 1833 the number of children attending the 5229 primary schools alone exceeded 370,000. If the progress of education had been great, the diminution of immorality is not less striking, for one finds the number of foundlings (*enfans trouves*) to have amounted to 11,023 in 1823, whilst in 1833 they did not exceed 7997. This is not a place to develope subjects of this kind, but the above examples will suffice to show, that Belgium is making considerable progress in those branches of administration and general morality which are the most essential to the well-being of a nation. It must not be omitted to state, that the tables in question give the population to the 1st of January 1835 at 4.165,953 souls; the superfices of the soil at 3,420,570 hectares (each 2½ acres,) of which 381,470 hectares, or about one-tenth, are uncultivated, not including more than 100,000 hectares or 1-84th of roads and canals. In France, the uncultivated land, out of a superfices of 52,570,000 hectares, amounts to 9,000,000, or one-sixth; and the roads, canals, streets, &c. to 1,216,746, or one-fifth; both of which show a remarkable balance in favor of Belgium.—

Algerine Mortar.—The mortar used by the ancients in their buildings has always been highly praised as much superior to that of the moderns. Pananti, a recent Italian writer on Algiers, paid a good deal of attention to the subject when residing in Africa, supposing it probable, from the well-known stationary character of Oriental habits, that the ancient method of preparing it might be preserved there, though lost in Europe. He informs us, that the mortar used at Algiers is made of two parts wood-ashes, three parts lime, and one part sand—to this composition they give the name *Tabbi*. After mixing these ingredients together, they throw in a quantity of *oil*, and beat the whole together for three days and nights without intermission, by which time it has attained the proper consistence. After being used in building, it becomes harder than marble, is impermeable to water, and resists the operation of Time and the elements.

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

TABLE IV.—THE VELOCITY (23 *Experiments*).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
No. of Experiment.	Boat's name.	Instant of passing the stake.	Stakes 110 yards apart.	Time of passing the stake-interval.	Miles per hour.	Tractive power in lbs.	Feet per second.	Kind of tractive power.	Load.	Wind.	Draught. Bow.	Draught. St'n	Position of Wave.	Variation in Level.	REMARKS. PLACE OF EXPERIMENT, FORTH AND CLYDE CANAL.
		m. s.		sec.	miles.	lbs.	feet.								
157	VELOCITY.	14 16	b	20	11·25	407·8	16·50	Two Horses.	7 passengers, = c. q. lb. 9 2 1	not obs.	in. 11	in. 8	not obs.	dur. run. bow elev. 43	Weight of VELOCITY, when empty, 3 ton. 15 cwt. 2 qr. 9 lb.
		14 36	c	19½	11·54	396·7	16·92								
		14 55½	d	19½	11·54	382·3	16·92								
		15 15	e	20½	10·97	375·1	16·09								
		15 35½	f												
158	VELOCITY.	29 38	b	26	8·65	283·0	12·69	do.	do.	do.	do.	do.	do.	do. do. elev. 29	
		30 04	c	25	9·00	267·2	13·20								
		30 29	d	24	9·38	259·6	13·75								
		30 53	e	26½	8·49	261·4	12·45								
		31 19½	f												
159	VELOCITY.	59 13	b	18½	12 16	440 5	17·84	do.	do.	do.	do.	do.	do.	do. do. elev. 86	
		59 31½	c	19½	11·54	415·2	16·92								
		59 51	d	20	11·25	383·4	16·50								
		11	e	18½	12·16	382·4	17·84								
		29½	f												
160	VELOCITY.	25 40	b	26	8·65	314·1	12·69	do.	7 passengers, and 1 ton, = c. q. lb. 29 2 1	do.	11	11	do.	at rest bow dep 11' dur. run. elev. 33'	
		26 06	c	25½	8·82	327·(	12·94								
		26 31½	d	23½	9·57	360 6	14·04								
		26 55	e	26	8·65	347·2	12·69								
		27 21	f												
161	VELOCITY.	35 21½	b	19½	11·54	467·7	16.92	do.	do.	do.	do.	do.	do.	do. do. elev. 43′	
		35 41	c	20	11·25	444·7	16·50								
		36 01	d	20	11·25	426·7	16·50								
		36 21	e	20½	10·97	423·8	16·09								
		36 41½	f												
162	VELOCITY.	44 56	b	55	4·09	47·0	6·00	do.	do.	very light	do.	do.	do.	do. do. level	
		45 51	c	55	4·09	42·1	6·00								
		46 46	d	58½	3·84	38·4	5·64								
		47 44½	e	58½	3·84	37·5	5·64								
		48 43	f												
163	VELOCITY.	21 12½	b	21	10·71	474·6	15·71	do.	7 passengers, and 2 tons = c. q. lb. 49 2 1	do.	12½	12½	do.	do. do. e ev. 30′	
		21 33½	c	21½	10·47	442·4	15·35								
		21 55	d	22	10·23	425·4	15·00								
		22 17	e	21	10·71	429·0	15 71								
		22 38	f												
164	VELOCITY.	32 43	b	27	8·33	362 6	12 22	do.	do.	do.	do.	do.	do.	do. do. elev. 43′	
		33 10	c	26½	8·49	358·4	12·45								
		33 36½	d	27	8·33	381·0	12.22								
		34 03½	e	26½	8·49	386·7	12·45								
		34 30	f												
165	VELOCITY.	43 54	b	50	4·50	63·2	6·60	do.	do.	do.	do.	do.	do.	do. do. level.	
		44 44	c	53	4·25	57·3	6·23								
		45 37	d	53	4·25	51·5	6·23								
		46 30	e	52½	4·29	55·5	6·29								
		47 22½	f												
166	VELOCITY.	18 22	b	24	9·38	484·5	13·75	Two Horses.	7 passengers, and 3 ton, = c. q. lb. 69 2 1	very light	in. 13½	in. 13½	not. obs.	dur. run. bow elev. 36′	
		18 46	c	23	97 8	467·3	14·35								
		19 09	d	22½	10·00	451·0	14·67								
		19 31½	e	22½	10.00	424·5	14·67								
		19 54	f												

TABLE IV. CONTINUED.—THE VELOCITY.

167	VELOCITY.	28 08 28 36 29 03½ 29 32 30 00½	b c d e f	28 27½ 28½ 28½	8·03 8·18 7·90 7·90	386·0 376·7 387·8 412·0	11·79 12·00 11·58 11·58	do.	do.	do.	do.	do.	do.	do. do. elev. 40′	
168	VELOCITY.	39 17 40 11½ 40 05½ 41 00 41 54	b c d e f	54½ 54 54½ 54	4·13 4·17 4·13 4·17	53·4 50·4 57·6 54·3	6·06 6·11 6·06 6·11	do.	do.	do.	do.	do.	do.	do. do. level	
169	VELOCITY.	6 29 6 52 7 14½ 7 37 8 58	b c d e f	23 22½ 22½ 21	9·78 10·00 10·00 10·71	462·8 455·0 447.5 438·2	14·35 14·67 14·67 15·71	do.	do.	do.	17½	10	do.	at rest. bow dep. 45′ dur. run. elev. 52′	Weight shifted forward.
170	VELOCITY.	25 55 26 21 26 47 27 13 27 41	b c d e f	26 26 26 28	8·65 8·65 8·65 8·03	432·6 419·3 424·3 436·2	12·69 12·69 12·69 11·79	do.	do.	none	15½	12	do.	dur. run. bow elev. 52	do.
171	VELOCITY.	35 42½ 36 06 36 28 36 50 37 12½	b c d e f	23½ 22 22 22½	9·57 10·23 10·23 10·00	488 471·2 423·6	14·04 15·00 15·00 14·67	do.	do.	do.	do.	do.	do.	do. do. elev. 29	
172	VELOCITY.	1 32 1 55½ 2 19 2 41½ 3 40	b c d e f	23½ 23½ 22½ 22½	9·57 9·57 10·00 10·00	482·5 461·5 447·3 440·7	14·04 14·04 14·67 14·67	do.	do.	do.	16½	11⅝	do.	do. do. elev. 24′	Weight shifted aft.
173	VELOCITY.	30 23½ 30 48 31 12 31 38 32 07	b c d e f	24½ 24 26 29	9·18 9·38 8·65 7·76	504·5 489·2 481·3 485·7	13·47 13·75 12·69 12·38	do.	7 passengers, and 4½ ton, = c. q. lb. 94 2 1	do.	do.	15½	15½	do. do. elev. 54′	Heavy swell.
174	VELOCITY.	41 31 42 26 43 20 44 15 45 14	b c d e f	55 54 55 59	4·09 4·17 4·09 3·81	51·3 53·2 55·8 46·1	6·00 6·11 6·00 5·59	do.	do.	do.	do.	do.	do.	do. do. level	
175	VELOCITY.	54 16½ 54 44 55 12 55 42 56 12	b c d e f	27½ 28½ 29½ 30	8·18 7·90 7·59 7·50	450·5 443·0 450·0 449·0	12·00 11·58 11·19 11·00	Two Horses.	7 passengers, and 4¼ ton, = c. q. lb. 94 2 1	none	watr. in. 15½	watr. in. 15½	not obs.	dur. run. bow elev. 45′	
176	VELOCITY.	15 15 15 40 16 08 16 26 17 06	b c d e f	25 28 28 30	9·00 8·03 8·03 7·50	484·8 491·7 491·3 487·4	13·20 11·79 11·79 11·00	do.	do.	do.	20½	10		at rest, dep. 45′	Little Swell. Weight shifted forward.
177	VELOCITY.	6 10½ 6 35 7 00 7 27 7 54	b c d e f	24½ 25 27 27	9·18 9·00 8·33 8·33	500·4 505·6 506·0 522·0	13·47 13·20 12·69 12·22	do.	do.	do.	do.	do.	not obs.	at rest. dep. 45 dur. run. bow elev.	
178	VELOCITY.	22 49 23 14 23 39 24 05 24 32	b c d e f	25 25 26 27	9·00 9·00 8·65 8·33	489·5 492·8 504·2 512·1	13·20 13·20 12·69 12·22	do.	do.	do.	18	13	do.	do. do. bow elev. 52′	Weight shifted aft.
179	VELOCITY.	40 56 41 20 41 45 42 11½ 42 38½	b c d e f	26 25 26½ 27	8·65 9·00 8·49 8·33	489·2 502·0 460·0 509·0	12·69 13·20 12·45 12·22	do.	do.	do.	12¾	18	do.		do.

TABLE V.—THE EAGLE (28 *Experiments.*)

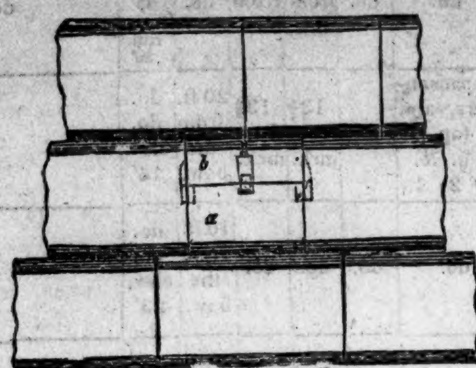
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
No. of Experiment.	Boat's Name.	Instant of passing the Stake.	Stakes 110 yards apart.	Time of passing the Stake-interval.	Miles per Hour.	Tractive Power in lbs.	Feet per Second.	Kind of Tractive Power.	Load.	Wind.	Draught. Bow	St'rn	Position of Wave.	Vriation in Level.	REMARKS. PLACE OF EXPERIMENT. FORTH AND CLYDE CANAL.
		m. s.		sec.	miles.	lbs.	feet.								
180	EAGLE.	10 10 10 31 10 49 11 08½ 11 28½	*b* *c* *d* *e* *f*	21 18 19½ 20	10·71 12·50 11·54 11·25	381·6 335·5 415·6 400·0	15·71 18·33 16·92 16·50	Two Horses.	7 passengers. = *c. q lb.* 9 2 1	none	watr. in. 18 from mrk.	watr. in. 18 from mrk.	not obs.	dur. run. bow elev. 13′	Weight of EAGLE, 3 ton. 14 cwt. 0qr. 15lb. Towing-line fixed 15½ft. from bow. The lines of draught not being marked on this boat; the boats were therefore taken from two marks placed above the water at stem and stern.
181	EAGLE.	22 51 23 16½ 23 40½ 24 05 24 29	*b* *c* *d* *e* *f*	25½ 24 25 24	8·82 9·38 9·00 9·38	292·1 295·4 303·0 300·8	12·94 13·75 13·20 13·75	do.	do.	do.	do.	do.	do.	do. do. elev. 15′	
182	EAGLE.	34 15½ 35 10 36 05 36 59½ 37 54	*b* *c* *d* *e* *f*	54½ 55 54½ 54½	4·13 4·09 4·13 4·13	63·6 57·5 59·7 55·9	6·06 6·00 6·06 6·06	do.	do.	do.	do.	do.	do.	do. do. level	
183	EAGLE.	48 59 49 22½ 49 44 50 07½ 50 31	*b* *c* *d* *e* *f*	23½ 21½ 23½ 23½	9·57 10·47 9·57 9·57	336·3 322·8 310·4 289·3	14·04 15 35 14·04 14·04	do.	do.	do.	do.	do.	do.	do. do. elev. 10′	
184	EAGLE.	14 00½ 14 21 14 40½ 15 00 15 20½	*b* *c* *d* *e* *f*	20½ 19½ 19½ 20½	10.97 11.54 11.54 10.97	418·8 417·1 407·0 395·2	16·09 16·92 16·92 16·09	do.	7 passengers, and 1 ton, = *c. q. lb.* 29 2 1	do.	16⅛ from mrk.	16⅛ from mrk.	do.	do. do. elev. 16′	
185	EAGLE.	24 56½ 25 21 25 46 26 11 26 37	*b* *c* *d* *e* *f*	21½ 25 25 26	10·47 9·00 9·00 8·65	334·6 322·8 316·4 300·6	15·35 13·20 13·20 12·69	Two Horses.	do.	do.	do.	do.	do.	do. do. elev. 16′	
186	EAGLE.	36 02 36 54 37 34 38 39½ 39 33	*b* *c* *d* *e* *f*	52 52 53½ 53½	4·33 4·33 4·21 4·21	69·8 60·4 55·2 59·4	6·23 6·35 6·17 6·17	do.	do.	do.	do.	do.	do.	do. do. level	
187	EAGLE.	2 16 2 37 2 57 3 17½ 3 38	*b* *c* *d* *e* *f*	21 20 20½ 21½	10·71 11·25 10 97 10·47	404·3 416·6 395·5 378·3	15·71 16·50 16·09 15·35	do.	do.	do.	14 from mrk.	17½ from mrk.	do.	do. do. elev. 1′	Weight shifted forward.
188	EAGLE.	21 34 21 56 22 15½ 23 35½ 23 56½	*b* *c* *d* *e* *f*	22 19½ 20 21	10·23 11·51 11·25 10·71	396·2 404·1 375·2 369·5	15·00 16·92 16·50 15·71	do.	do.	do.	17¼ from mrk.	14⅛ from mrk.	do.	do. do. elev. 38′	do. aft. Little swell.
189	EAGLE.	50 50 51 12 51 32 51 53 52 14½	*b* *c* *d* *e* *f*	22 20 21 21½	10·23 11·25 10·71 10·47	415 8 423 8 414 5 402·0	15.00 16·50 15·71 15·35	Two Horses.	7 passengers, and 2 tons, = *c. q. lb.* 49 2 1	none	watr. in. 14½ from mrk.	watr. in. 14½ from mrk.		dur. run. bow elev. 2′	Very little swell.
190	EAGLE.	2 45 3 11 3 36 4 01 4 27	*b* *c* *d* *e* *f*	26 25 25 26	8·65 6·00 9·00 8·65	363·0 354·5 336·5 341·8	12 69 13·20 13·20 12·69	do.	do.	do.	do.	do.	near bow	do. do. elev. 16′	
191	EAGLE.	18 07 17 46½ 19 25 20 06 20 46½	*b* *c* *d* *e* *f*	39½ 38½ 41 40½	5·69 5·84 5·49 5·56	122·1 119·8 105·1 102·2	8·35 8·57 8·05 8·15	do.	do.	do.	do.	do.	not obs.	do. do. level.	
192	EAGLE.	42 38 43 00½ 43 21½ 43 42 44 04	*b* *c* *d* *e* *f*	22½ 21 21 22	10·0[illegible] 10·71 10·71 10·23	404·2 404 2 374·0 367·1	14·67 15·71 15·71 15·00	do.	do.	do.	14¼ from mrk.	16⅛ from mrk.		a [illegible] bow dep. durin. run. elev. 15′	Weight shifted forward.

TABLE V. CONTINUED.—THE EAGLE (28 *Experiments*).

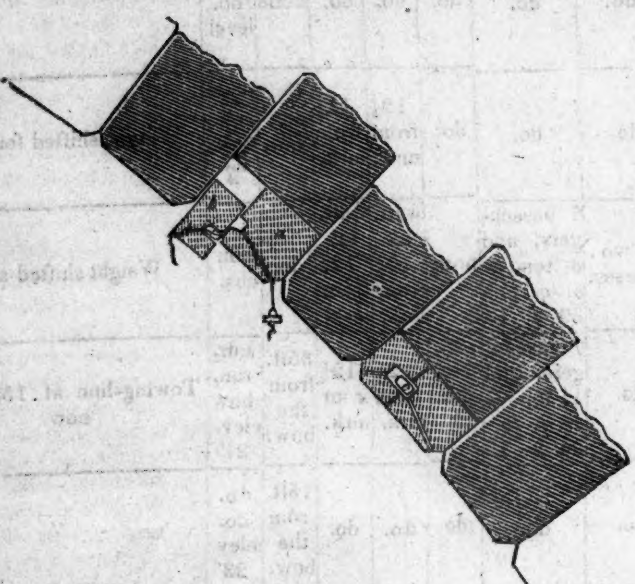
193	EAGLE.	22 05 22 27 22 49 23 10½ 23 32	*b* *c* *d* *e* *f*	22 22 21½ 21½	10·23 10·23 10·47 10·47	419·7 400·0 421·8 388·0	15·00 15·00 15·35 15·35	do.	do.	do.	16⅝ from mrk.	13⅛ from mrk.	do.	at rest bow elev. 15' durin. run. 30'	do. aft.
194	EAGLE.	51 28 51 50½ 52 13 52 35 52 56	*b* *c* *d* *e* *f*	22½ 22½ 22 21	10·00 10·00 10·23 10·71	426·4 417·8 416·7 399·7	14·67 14·67 15·00 15·71	do.	7 passengers, and 3 ton, = *c. q. lb.* 69 2 1	do.	13⅝ from mrk.	13⅝ from mrk.	20 ft. from the bow.	do. do. elev. 14′	
195	EAGLE.	8 31½ 8 57 9 22½ 9 48½ 10 16	*b* *c* *d* *e* *f*	25½ 25½ 26 27½	8·82 8·82 8·65 8·18	363·1 357·4 372·4 372·0	12·94 12·94 12·69 12·00	do.	do.	do.	do.	do.	10 ft. from the bow.	do. do. elev. 23′	
196	EAGLE.	24 15 24 54 25 32½ 26 12 26 51	*b* *c* *d* *e* *f*	39 38½ 39½ 39	5·78 5·84 5·69 5·78	133·3 127·5 121·0 113·5	8·46 8·57 8·35 8·46	do.	do.	do.	do.	do.	none	do. do. level.	
197	EAGLE.	50 31 50 54½ 51 16½ 51 38½ 52 00	*b* *c* *d* *e* *f*	23½ 22 22 21	9·57 10·23 10·23 10·47	414·1 423·5 418·0 391·6	14·04 15·00 15·00 15·35	do.	do.	do.	12⅛ from urk.	15⅛ from mrk.	not. obs.	at rest. bow ded. 15 during. run. elev. 15	Weight shifted forward.
198	EAGLE.	12 57 13 21 13 44 14 06 14 27½	*b* *c* *d* *e* *f*	24 23 22 21½	9·38 9·78 10·23 10·47	415·7 411·7 413·0 400·6	13·75 14·35 15·00 15·35	Two Horses.	7 passengers, and 3 ton, = *c. q. lb.* 69 2 1	none	watr. in. 15¼ from mrk.	watr. in. 12¼ from mrk.	do.	not. obs.	Weight shifted aft.
199	EAGLE.	36 59 37 23 37 45½ 38 09½ 38 32	*b* *c* *d* *e* *f*	24 22½ 24 23	9·38 10·00 9·38 9·78	441·5 446·1 423·5 424·5	13·75 14·67 13·75 14·35	do.	7 passengers, and 1¼ ton = *c. q. lb.* 94 2 1	do.	12½ from mrk.	12½ from mrk.	35ft. from the bow.	dur. run. bow elev. 21′	Towing-line at 15ft. from bow
200	EAGLE.	50 01½ 50 27½ 50 54 51 21 51 49	*b* *c* *d* *e* *f*	26 27 27 28	8·65 8·33 8·33 8·03	452·6 385·7 406·8 413·0	12·69 12·22 12·22 11·79	do.	do.	do.	do.	do.	15ft. from the bow.	do. do. elev. 23′	
201	EAGLE.	1 40 2 17½ 2 54 3 29½ 4 06	*b* *c* *d* *e* *f*	37½ 36½ 35½ 36	6·00 6·16 6·34 6·16	170·5 151·4 147·4 150·5	8·80 9·04 9·30 9·04	do.	do.	do.	do.	do.	not. obs.	do. do. level.	
202	EAGLE.	20 23 20 47 21 12½ 21 36 22 21½	*b* *c* *d* *e* *f*	24 25½ 23½ 25½	9·38 8·82 9·57 8·82	422·8 413·3 439·3 427·3	13·75 12·94 14·04 12·94	do.	do.	do.	10¾ from mrk.	14 from mrk.	15ft. from the bow.	do. do. elev. 27′	Weight shifted forward.
203	EAGLE.	36 39½ 37 05 37 29 37 53 38 18½	*b* *c* *d* *e* *f*	26½ 24 24 25½	8·49 9·38 9·38 8·82	429·4 439·0 442·8 432·3	12·45 13·75 13·75 12·94	do.	do.	do.	14 from mrk.	11 from mrk.	not obs.	do. do. elev. 37′	do. aft.
204	EAGLE.	5 25 5 47 6 09 6 31 6 53	*b* *c* *d* *e* *f*	22 22 22 22	10·23 10·23 10·23 10·23	438·4 419·7 400·0 372·4	15·00 15·00 15·00 15·00	do.	7 passengers, and 2..13ct= *c. q. lb.* 32 2 1	do.	14¼ from mrk.	14¼ from mrk.	do.	do. do. elev. 17′	2 ton. 13cwt. made the EAGLE, and 7 passengers, nearly equal to ZEPHYR, with 4 ton. 4cwt. 2 qr. and 7 passengers.
205	EAGLE.	22 53 23 20 23 46 24 12 24 39	*b* *c* *d* *e* *f*	27 26 26 27	8·33 8·65 8·65 8·33	357·5 351·0 367·6 375·2	12·22 12·69 12·69 12·22	do.	do.	do.	do.	do.	do.	do. do. elev. 17′	
206	EAGLE.	39 53½ 40 17 40 40 41 02½ 41 26	*b* *c* *d* *e* *f*	24½ 23 22½ 23½	9·18 9·78 10·00 9·57	395·1 407·0 411·2 485·6	13·47 14·35 14·67 14·04	do.	do.	do.	do.	do.	do.	do. do. elev. 31′	Towing-line altered from 15¼ ft. to within 3 ft. 9 in. of the bow.

Plate 5.

RESTORING ARCHSTONES AT BLACKFRIARS BRIDGE.



View of Soffit.



Section.

DESCRIPTION OF THE PLAN OF RESTORING THE ARCHSTONES OF BLACKFRIARS BRIDGE. BY JAMES COOPER, A. INST. C. E. COMMUNICATED IN A LETTER TO THE SECRETARY.

From the perishable nature of the material with which even the largest bridges were built, before the use of granite became so common as it has of late years in the more important structures of this kind, the best plan of repairing parts falling to decay, is a point of some consequence. With a view to contribute towards the stock of information on the subject, I beg to offer to the Institution the accompanying drawing (plate No. V), showing the mode that has been adopted by Messrs. Walker and Burges, of restoring the archstones of Blackfriars Bridge, with the following observations in explanation of it.

The decayed part is first cut out for the whole height of the course, to the depth of 15 inches generally, but in faulty places sometimes as much as 2 feet, and never in shorter lengths than a foot; and the beds and sides of the opening being dressed fair, moulds or templates are fitted into it to get the correct shape for the new work.

The stone is inserted in two thicknesses, the lower of which *a*, is dovetailed or radiated rather more than the original archstone, and the upper, *b*, slightly tapered like a wedge, to enable it to be driven; the dimensions of the two when put together making up the size of the cavity. Circular holes are sunk opposite each other in the adjoining beds of the two pieces to receive the dowel *c*, that in the lower part, *a*, being half the length of the dowel deep, while the corresponding hole in the part *b*, is deep enough to receive the dowel completely, so that when deposited in the hole, the dowel may offer no obstruction to getting the stone in; and from the bottom of these holes, openings, *d*, *e*, of about $\frac{3}{4}$ inch diameter are drilled to the chamfers on the face of the joints.

The dovetailed stone, *a*, is first set in mortar, and brought to a bearing on its bed, by wedging applied in the place afterwards to be occupied by the other half, *b*; which is next covered with mortar on the beds and joints, and driven in by wooden beetles until the circular holes in the beds come opposite each other, when, the cord *d* having been disengaged, the dowel *c* (held by it in the hole in the bed of the upper stone *b*) is drawn or pushed half its length into the stone *a*. Should the new stone be sufficiently in contact with the old work, which the sound from the beetle readily denotes, and be otherwise properly driven, mortar is rammed down the hole *d*, so as to surround the dowel and keep it in its proper place. The cord *e* for drawing the dowel home runs in a groove in the bed of the stone *a* from the dowel hole to the face of the archstone, and sometimes when it is not brought into action the dowel is pushed with a jointed piece of iron wire inserted through the opening *d* in the upper stone.

The wedge-formed stones, *b*, are usually 12 inches thick on the face, tapering off half an inch at the depth of 15 inches, and run from a foot to 2 feet 6 inches long, which they seldom exceed, as when thicker or longer they are found unwieldy to drive. These limitations are not, however, required in the dovetailed stone *a*, which is put in in as long lengths as are supplied, and its thickness is regulated by the cavity to be filled, the other stone, *b*, being, as has just been stated, generally uniform in this dimension. The dowels, which are of Craigleith stone, are 5 inches long and 3 inches diameter in the middle, diminishing to $2\frac{1}{2}$ inches at the ends.

When the new stone is inserted, as has been described, and the dowel secured in its place, it is evident that neither half can drop out, and that on the hardening of the mortar, though *two* pieces, they become for practical purposes *one* archstone. But while the work is in progress, and before the stone *b* is put in, the dovetailed stone *a* has a tendency to slide out, which is sometimes met by strutting from the scaffolding, or by leav. a small tenon on the under side of the new stone fitting into a mortise in the masonry beneath; but within six or eight courses on either side of the crown of the arch, and in other places, when a considerable length has been taken out, a joggle *f*, 4 inches long by $2\frac{1}{2}$ inches square, is inserted at each end of the new work, or in the case of a very short stone at one end only, being let from the upper bed of the stone *a* diagonally into the vertical joint between the new and the old work, so that half is in one and half in the other.

So far as I am aware, the above scheme is new, and it seems fully to meet the difficulties of the case; the new stones filling completely the hollows left by the old ones cut out, which from the radiation of the joints in an arch they could not if put in as one piece, and so giving a perfect bearing between the original and the restored work, while the whole is secured without injury to the adjoining masonry by external wedging or otherwise.

ON THE RELATION BETWEEN THE TEMPERATURE AND ELASTIC FORCE OF STEAM, WHEN CONFINED IN A BOILER CONTAINING WATER. BY MR. FAREY, M. INST. C.E.

This subject has occupied the attention of many able experimenters, and the concordance of the results which they have attained separately, leaves no doubt of the facts hereinafter stated.

Mr. Watt made experiments in 1764, and repeated them in 1774. Mr. Southern

went over them again in 1797 with great accuracy, and formed a theorem for calculating the results; Dr. Robinson and M. Bettancourt also made similar experiments; likewise Mr. Dalton, Mr. Woolf, and Mr. Philip Taylor; also Dr. Ure.

The writer of this communication undertook, several years ago to compare all the different experiments which had then been made, in order to obtain a standard, and was induced, after a careful examination*, to adopt Mr. Southern's theorem as the most authentic, being found very consistent with itself, and being confirmed, at several points of the scale, by the actual experiments of others, although the complete scales promulgated by some of those others were very discordant, from having been interpolated between the actual experiments by incorrect theorems; and particularly some scales which had been extended by such theorems beyond the range of their actual experiments, were found to be very far from the truth. In consequence, Mr. Southern's scale was made the foundation of all the Writer's computations and statements respecting steam; many of which have since been published.

The principal object of the present communication is, to show the coincidence between Mr. Southern's scale, and that of a new series of experiments made in Paris, in 1829, by a Committee of the Academy of Sciences, which confirms the standard so completely, as to leave no doubt of its truth.

Another object of the communication is to put on record, in the papers of the Institution, a memorial of the fair claim of our countryman, Mr. Southern, to the merit of priority in accurate determination of this law, in opposition to the unfounded assertion of the French author, who has published the new experiments, that the academicians had first established the truth in 1829, and that the previous determinations in England were erroneous†. Mr. Southern's determination is not mentioned in this sweeping condemnation, although it had been republished by Mr. Watt, Dr. Brewster, Dr. Thomson, and in the Writer's Treatise on the Steam Engine, also in that of Mr. Tredgold, and is well known, and very generally adopted, in fact, by the French academicians themselves.

The French experiments were continued up to twenty-four atmospheres; Mr. Southern's went only as far as eight atmospheres; he found the corresponding temperature to be 343·8 degrees of Fahrenheit's thermometer, and the academicians found it to be 341·8 degrees, or just two degrees less. At four atmospheres, Mr. Southern found the temperature 293·9 degrees, and the academicians 293·7. This last is not an accidental coincidence, but an adoption of Mr. Southern's scale, through Mr. Tredgold, though not acknowledged as such.

The French academicians have formed a theorem for calculating the temperatures corresponding to the elasticities, and by means thereof have extended their scale from twenty-four atmospheres upwards; nevertheless, they did not use their own theorem for the most useful part of the scale below four atmospheres, but they adopted a theorem from Mr. Tredgold in lieu of their own.

That theorem was made by Mr. Tredgold, from Mr. Southern's experiments, in lieu of Mr. Southern's own theorem, merely because Mr. Tredgold did not think that a power with a fractional index, viz., 5·13, is likely to represent the law of nature. This induced him to employ a higher power, with 6 for an index; and in consequence, his formulæ did not correspond at all with Mr. Southern's experiment at eight atmospheres, although it did correspond at four atmospheres. The academicians use an index of 5 in their theorem, rendering it very nearly the same in effect as Mr. Southern's.

In adopting this formula from Mr. Tredgold, (who quotes Mr. Southern's experiments, and takes them as his basis,) the French academicians could not have been ignorant of Mr. Southern's determinations, nor of their accuracy; for at eight atmospheres, his experiments and theorem is nearer to their own experiments than Mr. Tredgold's theorem, which they have adopted for that part of their scale which is below four atmospheres, and which theorem gives a result identical with Mr. Southren's theorem and experiments, at two and a half atmospheres, although Mr. Tredgold's becomes very incorrect below boiling, and also above four atmospheres.

Under these circumstances, it was not candid that all mention of Mr. Southern's determinations should have been suppressed, when in fact they are adopted at second hand, and through a less correct version than his own; and when it was found requisite to amend that version, and put it back very near to its original value, the author of that original should have been cited.

In a former report by the Academy in 1825, a Table was given, which is exactly Mr. Southern's numbers, and it would have been only fair, that his standard should have been acknowledged when adopted*. The merit of extending it, by further experiments, up to twenty-four atmospheres, in 1829, and thereby proving Mr. Southern's exactitude, is willingly acknowledged by the Writer of this communication, to be due to the French academicians.

When the temperature due to an elasticity of twenty-four atmospheres is calculated by Mr. Southern's theorem, it gives 438·2 degrees of Fahrenheit's thermometer, whilst the French experiment is 435·6, or only 2·6 degrees less; of this difference, some part is occasioned by the difference in the French and English mode of reckoning what an atmosphere is†. Again, for sixteen atmospheres, Mr. Southern's theorem gives 401·0 degrees, and the French experiment 368·5, or 2½ degrees less. At eight atmospheres, 2 degrees less, as before stated.

These small differences are less than the inevitable uncertainties of observation in such experiments, and it is to be remarked, that the elasticities were measured by the French academicians by the compression of air included in a manometer, and not by a direct measure of a column of mercury, or a loaded safety valve; whereas Mr. Southern used both those means, and employed very correct thermometers, and therefore his scale is of as much authenticity as that of the French; and the Writer of this communication does not think it requisite to make any alteration in the standard which he adopted long ago for all his calculations on this subjects, and of which many are published in his Treatise on the Steam Engine, where the subject is fully explained; and it is only necessary to give an extract therefrom, in order to state Mr. Southern's determination of a correct scale.

"From the comparison of a great number of his experiments, Mr. Southern invented a method of calculating the elasti-

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* The mode of examination was that which Mr. Smeaton and Mr. Watt pursued in similar cases, viz., to form curves for representing each scale, the temperature, in degrees of the thermometer, being the ordinates, and the elasticities, in atmospheres, being the abscissæ of the curves.

† The French account of the occasion of making their experiments on the temperatures corresponding to different elasticities of steam, in 1829, contain the following passage:—"Science did not then possess this knowledge, and engineers appointed to superintend the construction of steam engines, had no other guidance than some discordant measures upon the temperatures which correspond to the elasticities between one and eight atmospheres; for higher pressures there was no result of direct experiments, nor any theory which could supply the deficiency."

It is afterwards stated that only one experiment by Mr. Perkins was obtained in England, and that is shown to be altogether erroneous; and then, that "Germany was more advanced than England, for the results in question, Mr. Arzberger, at Vienna, having made experiments," but they are also shown to be inexact.

* In the account of the experiments of 1829, the former Table of eighteen hundred and twenty-five, is mentioned as "having been only presented temporarily, and as having been only deduced from interpolation of all the experiments which seemed to merit the most confidence, from the ability of the observers, and from the nature of the methods of observation;" but no mention is made of Mr. Southern, although the numbers are his.

† The French reckon an atmosphere to be equal to a column of mercury $\frac{76}{100}$ of a metre in height, which is only 29·92 inches, and the boiling point of their thermometer is adapted thereto, whereas, since about the commencement of the present century, the English have reckoned it to be 30 inches. This cirumstance accounts in some degree for their scale of temperatures differing from Mr. Southern's.

city of steam at different temperatures, when saturated with water; his method is embodied in the following rule, which will give results very nearly corresponding with the experiments.

"To find the elasticity of steam of any given temperature, that temperature being expressed in degrees of Fahrenheit's thermometer, and the elasticity being expressed by the height, in inches, of the column of mercury that the steam will support.

"Rule.—To the given temperature in degrees of Fahrenheit, add the constant temperature 51·3 degrees, and take out the logarithm of the augmented temperature from a table of logarithms; multiply that logarithm by the constant number 5·13, and from the product (which is a logarithm) deduct the constant logarithm 10·94123; then by the table of logarithms find the number corresponding to the remainder, (which is also a logarithm,) and that number is one-tenth of an inch less than the height required; therefore, by adding one-tenth of an inch to the said number, we have the proper height, in inches, of the column of mercury that the steam will support*.

"Example.—What is the elasticity of steam at 212 degrees of temperature? 212 deg + 51·3 deg = 263·3 deg; the logarith of that number is 2·42045, which × 5·13 = 12·4169; from this logarithm deduct the constant logarithm 10·94123. and the remainder is 1 47567; the number corresponding to this logarithm is 29·9 inches, and, adding one-tenth of an inch thereto, we have thirty inches of mercury for the required elasticity.

"The rule may be used conversely to find the temperature of steam of any given elasticity thus. Deduct one-tenth of an inch from the height in inches of the column of mercury; take out the logarithm of the diminished height, and add to it the constat logarithm 10·94123; then divide the sum of these logarithms by the constant number 5·13; and find the by Table of logarithms, the number which corresponds to the quotient: that number is 51·3 degrees more than the required temperature; therefore deduct 51·3 from the said number, and the remainder is the proper temperature in degrees of Fahrenheit.

"Example: What is the temperature of steam of an elasticity of 120 inches of mercury? 120 inc.—·1 = 119·9 inc. The logarithm of that number is 2·07882, to which add the constant logarithm 10·94123 = 13·02005, for the sum of the logarithms, which being divided by 5·13 constant number, gives 2·53802 quotient. The number corresponding to that logarithm is 345·2 degrees, from which deduct the constant temperature 51·3 degrees, and we have 293·9 degrees for the required temperature.

"Temperature. Degrees of Farenheit.		Elasticity. Column of mercury; inches.
32	freezing	0·18
42		0·25
52		0·35
62		0·50
72		0·71
82		1·01
92		1·42
102		1·97
112		2·68
122		3·60
132		4·76
142		6·22
152		8·03
162		10·25
172		12.94
182		16 17
192		20·04
202		24·61
212	boiling.	30·00

These numbers are nearly identical with experiments.

"The following Table has been calculated by Mr. Southern's theorem.

These numbers are from the French Academicians.	Temperature Degrees of Fahrenheit.	Elasticity. Column of mercury; inches.
212	212 =1 Atmos.	30·00
	222	36·32
	232	43·60
	242	52·20
250·5	250·2=2 Atmos.	60·00
	252	61·90
	262	73·00
	272	85·80
275·2	275 =3 Atoms.	90·00
	282	100·30
	292	116·70
293·7	293·9=4 Atmos.	120·00
	302	135·20
307·5	309·2=5 Atmos.	150·00
	312	156·00
	322	179 30
320·4	322·3=6 Atmos.	180·00
	332	205·40
331·7	333·7=7 Atmos.	410·00
	342	234·40
341·8	343·8=8 Atmos.	240·00"

Treatise on the Steam Engine, Vol. I. p. 72.

It is presumed that it has now been shown that English engiacers have, for more than 30 years past, been in possession of a standard scale, which is very accurate, and also of a theorem whereby the temperatcres corresponding to elasticities, exceeding 8 atmospheres, may be correctly represented, notwithstanding assertions to the contrary.

The complete scale laid down by the French Academicians is as follows.

Elasticities. Atmospheres.	Temperature in Degrees Fahrenheit. (French Academicians' rule)	Temperature in Degrees Fahrenheit. (Mr. Southern's rule)
1	212·0	212.0
$1\frac{1}{2}$	234·0	233 7
2	250·5	250·2
$2\frac{1}{2}$	263·8	263·8
3	275·2	275·0
$3\frac{1}{2}$	285·1	285·0
4	293·7	293·9
$4\frac{1}{2}$	300·3	301·9
5	307·5	309·2
$5\frac{1}{2}$	314·2	316·0
6	320·4	322·3
$6\frac{1}{2}$	326·3	328·1
7	331·7	333·7
$7\frac{1}{2}$	336·9	338·9
8	341·8	343·8
9	350·8	
10	358·9	
11	366·8	
12	374·0	376·3
13	380·7	
14	386·9	
15	392·9	
16	398·5	401·0
17	403·8	
18	408·9	
19	413·8	
20	418·5	421·1
21	423·0	
22	427·3	
33	431·4	
24	435·6	438·2

These numbers are calculated according to Mr. Southern's rule, which proceeds by the 5·13th power.

Atmospheres 1 to 4: Thus far was calculated by Mr. Tredgold's rule, which proceeds by the 6th power.

Atmospheres $4\frac{1}{2}$ to 24: These were calculated by the French Academicians' rule, which proceeds according the 5th power.

NOTE. At 4 atmospheres this complete scale changes its law of progression all at once, from the 6th power to the 5th power, which cannot be correct in principle. Neither the 6th power nor the 5th will give correct results in the lower part of the scale, between boiling and freezing, nor in the higher part of the scale. But Mr Southern's fractional power 5·13, applies without change throughout the whole range, from freezing up to the temperature of melting tin.

By examing the French scale, it appears to correspond with Mr. Southern's at 4 atmospheres within $\frac{2}{10}$ of a degree, but in advancing only to $4\frac{1}{2}$ atmospheres, it falls short $1\frac{6}{10}$ degrees therefrom, and yet, up at 24 atmospheres, the deficiency is but $2\frac{6}{10}$ degrees.

The French theorem is virtually to the same effect as that of Mr. Southern, for the logarithm of the elasticity in atmospheres is divided by 5 (instead of 5·13) in order to extract the 5th root, from which root unity, or 1, is to be deducted, and the remainder divided by the constant decimal ·7153, the quotient expresses the increase of temperature above boiling, in terms of the interval between freezing and boiling, that is, the said quotient expresses what fractional por-

* "The effect of multiplying the logarithm by 5·13, is to raise the 5·13th power of the temperature, when augmented as above, and then the effect of deducting the constant logarithm 10·94123, is to divide the high power previously raised, by a very large number, viz., (87344 000 000) eighty-seven thousand three hundred and forty-four millions. The quotient resulting from this division of the high power, with the constant addition of one-tenth of an inch, is the required elasticity in inches of mercury."

tion of 180 degrees of Fahrenheit, the temperature is above the boiling point.

This is by no means a convenient rule, and does not apply without modification to temperatures below boiling, which Mr. Southern's does most accurately. The French rule, if modified, becomes inaccurate.

The only question as to the law of progression in the French rule being better than that of Mr. Southern's, is whether the 5·13 power is more authentic than the 5th power. Now the Academicians found Mr. Tredgold's rule, which proceeds by the 6th power, did better than their own, between one and four atmospheres, but it will not correspond either at lower or higher parts of the scale, whilst Mr. Southern's corresponds accurately below, and very nearly throughout.

Mr. Southern's theorem is prefarable to any other for calculations concerning the heights of mountains, according to observations of the temperatures at which water is found to boil at their summits and at their bases.

On considering all these circumstances, we shall find good reasons for adhering to Mr. Southern's theorem, because it is unquestionably accurate in all the lower part of the scale below boiling, and also above the same, as far as experiments can be made with certainty; and the new experiments of the academicians prove, that at very high parts of the scale, it cannot be far from the truth; but as there is no certainty in the exactitude of either temperatures or elasticities, when so great as 438 degrees and 24 atmospheres, it is not advisable to adopt a new law of progression for the sake of reconciling differences of 2½ degrees from uncertain observations, when that new law will not correspond so well as the established law, with very certain and unquestionable observations.

67, Guildford St eet, Russell Square,
1 May, 1833.

P. S. It would be useful information, if some of the junior members, who have leisure, would undertake to calculate the temperatures according to Mr. Southern's rule, for every half atmosphere between 8 atmospheres and 24 atmospheres, now that the French experiments have shown that his rule will apply to such an extent with very probable accuracy.

Items.

Expeditious Calculation.—The actuary of a savings' bank in the neighborhood of Fitzroy square, has invented a machine for expeditiously and accurately calculating the interest due to depositors, the value of which may be deduced from the following particulars:—The accounts open on the 20th November, 1835, were 2,421, and occupied the late actuary four weeks.—The accounts open on the 20th November, 1836, were 2,734, and occupied the present actuary only 74 hours. An opinion may be formed of the assistance given by the machine from the following detail of the minutiæ necessary to arrive at the materials for the annual return required from savings' banks by the Commissioners for the reduction of the National Debt. The time taken to calculate the interest on 2,734 accounts, to enter it on the ledgers, to make the additions, to rule the lines, to take out each account under its proper classification, and to take out the folies of 4,292 closed accounts, amounted to 74 hours, making an average of 9¼ hours for each of the eight ledgers, or 91 accounts per hour.

Wear of Carriage Wheels.—It has been calculated, by an engineer of eminence, that every four-horse coach deposites 12 lb. of iron in every 100 miles of its journey, and that consequently, assuming the number of such coaches passing daily between London and Birmingham alone to be 20, the weight of iron deposited during every transit exceeds 240 lbs. These results, it is stated, are not conjectural, but derived from investigations applied to the horse-shoe and the tire of the wheel—in the first instance, previously to use; and, in the second, after the wear and tear of the road had rendered them useless; and they have been found, it is added, as to every ton weight of iron so tried, nearly uniform.

Busts and Portraits.—A new instrument has been invented in Paris, called the Phisiognotype, for the moulding of busts, on a principle which renders the likeness to the original a mechanical certainty. Busts in plaster are thus produced for five francs each. Another machine, entitled the Portrait-mirror, has also been constructed, by which a portrait may be taken in twenty minutes, from the reflection of the face of the original in a looking-glass.—[Athenæum.]

MORUS MULTICAULIS NOT PRODUCED FROM ITS OWN SEEDS.

The following statement agrees with what we were first to inform our country men of, in this journal, more than two years ago, on the authority of an experiment reported in the *Annales de l'Agriculture Francaise*, that the *morus multicaulis* had been found to be merely a variety of white mulberry, and did not reproduce its own kind by seeds. This very important fact (if true) we have again and again endeavored to impress on the agricultural public—but apparently to no purpose. The anxiety to obtain seeds of the *morus multicaulis* has been so great, that encouragement has been thereby afforded to extensive frauds, by the seller substituting seeds of another kind. But even if the seeds had been what they were supposed to be, if from trees of the true *multicaulis*, the failure and disappointment would probably have been as great.

But though believing that the seeds of this plant are not to be relied on for reproducing their own kind, we are not inclined in any case to trust to reported opinions, or authority that is the least doubtful, when the facts can be tested by accurate experiment. We have the means of making such an experiment, in seeds of the *morus multicaulis* taken last summer from trees which grew within the enclosure of the high walls which surround the Penitentiary of Virginia, and near which no other kind of mulberry grew, to affect the seeds by a mixture of the fecundating farina. If *these seeds* will not produce the *morus multicaulis*, it may be thereafter safely pronounced, that seeds are not only not to be relied on to produce this kind, but that the result of reproduction of the like kind rarely, if ever, occurs.

"This mulberry, it is now well ascertained, is a hybrid variety, and not a true species—the seed will not produce its like. We have been informed by a gentleman who purchased a plant, three or four years since, of some nurserymen of our vicinity, that with considerable care he raised quite a number of seeds. The plant was taken up upon the appearance of severe weather, and placed in a cellar where the frost did not penetrate—the roots were slightly covered with earth. Pursuing this course two succeeding winters, it attained the size of a large shrub with numerous ramifying branches—the third season it produced seeds. No other species or variety grew in the vicinity of the plant, and the blossoms consequently could not have been fertilized but by its own pollen. These seeds were carefully sown, and the result was a number of seedling plants, with foliage of all sizes and textures from the common white, to that of the parent. No better proof is needed to confirm what we now state, and have heretofore stated."

[American Gardener's Magazine.]

Succory Coffee.—Succory root, cut, oot, dried, torrefied, and ground to powder, is most extensively employed as a substitute for coffee, or rather, I ought to say, st adulterate coffee. A full account of the preparation of it will be found in the *Annales des Chemie*, lix. p. 307. Its consumption is so great, that some fear has been expressed of its seriously injuring trade in, and cultivation of, coffee; and the Chancellor af the Exchequer has prepared to lay a tax on it. I am told that it is employed very largely by grocers to adulterate their coffee, by coffee-house keepers, and by economical house-keepers. It yields a perfectly wholesome and agreeable beverage, but wants that fine aromatic flavor peculiar to coffee, and for which the latter is celebrated.—[Mr. Perira's Lectures in the Medical Gazette.]

A new Method of Playing the Violin.—A Monsieur Isoard has constructed a violin to be played by a pair of bellows. The performer holds the instrument after the manner of the violincello; his feet work the bellows, and his right hand directs the stream of air to the string requiring it.—[Musical World.]

or the inner bark of the linden tree. For the upper part any kind of cloth may be used, and the shoes lined with linen or cotton. The soles are then varnished or covered with the following composition:—One quart of flax-seed oil, two ounces of rosin, half an ounce of white vitriol, which must be boiled together for half an hour After which take four ounces of spirits of turpentine, and two ounces of white oak saw-dust, which has been exposed twenty-four hours to the sun; mix these ingredients well together, and put them on the soles of the shoes with a brush or in any

other way, which, when dried, will render them impervious to water."

A MACHINE ON A NEW PRINCIPLE, FOR RAISING WATER, COALS, &c.—The construction of this power is very simple, and its steady operation is quite assured. Its chief agent is a pair of wheels; or, if necessary, a series, moving with their diameters in the direction of the weight to be raised,—say the shaft of a mine. Taking the one pair of wheels, moving on the same axis, we find that, from the end of a radius or arm in each, a chain descends, so as to hang on opposite sides of a square passage. To each chain are suspended at different but regulated distances, quadrangular frames, to the upper sides of which strong projecting iron rims, moving on the principle of the hinge, are attached. The boxes, or receptacles for the weight to be raised, have corresponding edges on each side. When the wheel above is turned, and a single box below is placed in connexion with the lowest frame, it is caught by its rim, and, with one revolution of the wheel, is sent up as high as the frame on the opposite side to that on which it is borne; here it is again caught and sent up to the apparatus on the opposite side again, and so on, by alternate transmission, it is brought to the top of the shaft. The machine being kept constantly laden below, and its wheel constantly turned above, it follows, that, at each revolution of the wheel, a box is delivered; and thus, in an exceedingly short space of time, a vast body of matter can be carried up through any depth of shaft. The raising of water is performed by means of the same machinery, only buckets with valves in the bottom are used instead of boxes. The machine could be most humanely employed, in large mines, in quickly sending the workmen up or down, to save them from their present tedious and tiresome expedients for that purpose.—[Mining Journal.]

INTERESTING TO BLACKSMITHS.—Permit me to describe a machine which I have just seen, and which, for utility and simplicity, is truly admirable. The article I allude to is a substitute for a smith's bellows, and is far more powerful than the kind in common use. It is constructed in the way of fanners, and stands immediately behind the forge. The box of the implement is only eighteen inches diameter, and the fans which fill the box are only five inches broad, and are fastened upon a horizontal shaft of ¾-inch iron. On the end of the shaft is a pulley two inches diameter, and right above which is a larger pulley twenty-inches diameter, with a crank in the centre, which the man at the fire drives with one hand, while he guides the iron in the fire with the other. Around the large pulley and down to the small one is a leathern belt, by which this machine is driven, and with such ease that a child may drive it. The blast is so constant and so efficient, that the contriver prefers it for heavy work to the best bellows, which cost him 6*l*., while he has the blast-bellows for about 30*s*; and he adds, that, for a few more shillings, he could have it driven by wind. Although bellows on the same plan have been used and driven by steam and by water at our large iron-works, yet the merit of constructing one to work with the hand, belongs to Mr. William Bowle, blacksmith, Lower Bridge-street, Stirling. What adds much to the value of this contrivance is, its being easily purchased, that it requires little room, and is in many respects superior to the kind in common use. I hope, therefore, the sons of Vulcan will duly appreciate the contrivance.—[Correspondent of the Stirling Journal.]

INSTRUMENT APPLICABLE TO VARIOUS DISEASES OF THE LUNGS.—A. M. Maissiat has submitted to the French Academy of Sciences an instrument, by which he proposes to convey liquids into the cavities of the lungs, or extract from it any gas, or liquid, to hold it in a state of dilatation, &c., as circumstances may require. He has also invented and laid before the same body another instrument, which is an improvement upon cupping glasses, and may entirely supersede the use of leeches.

DISCOVERY OF ROMAN REMAINS.—A great many Roman remains have been recently discovered at Exeter; consisting, it is said, of a complete Roman city below the western market, which has been lately excavated and rebuilt on a grand scale. The relics prove the existence of the ancient Isca of Ptolemy and Antonius on this spot. They consist of more than 400 Roman Coins, of copper and silver, from Claudius to Valens; a very great quantity of the ancient red Samian pottery, sepulchral urns, amphoræ, pateræ, simpula, two curious lamps, lachrymatories, terracottas of great beauty, relating to mythological subjects, two sepulchral vaults, &c. The excavations are superintended by Captain Short, of Heavitree, who is considered an able and excellent antiquary.—[Mining Journal.]

EFFECT OF THE VELOCITY OF AIR UPON ITS USE IN SMELTING IRON.—Mr. Teploff one of the Russian mining corps, in an article on the improvements recently introduced into the smelting of iron in Russia makes the following statement. In the smelting furnaces of the Ural, where the quantity and velocity of the blast are properly regulated, 1.4 of pig iron is obtained by 1 of charcoal fuel, while in other furnaces they obtain but .4 and .6 by the same consumption of fuel.

The velocity of the blast being increased, the heat within is increased, without a corresponding consumption of fuel. In an experiment made by order of the government, it was found that one hundred cubic feet of air, under a pressure of two inches of mercury, produced the same effect as two hundred cubic feet, under a pressure of one inch, with this difference, that in the latter case, twice the fuel was consumed which was required in the former case.

In one furnace which is mentioned, 22,000 lbs. of iron were obtained in twenty-four hours, by 16,000 lbs. of charcoal. Previous to the due regulation of the draught, they consumed twice this amount of fuel for the same yield of iron.

This economy is obtained by duly proportioning to each other the size of the blast-pipe, and the pressure of the draught. The relation of these to each other varies with the furnace.

M. Teploff asserts that the results thus obtained exceed those with the hot-air blast; but it does not appear that any comparisons have been made under his examination, and with the charcoal fuel.

To regulate the draught, it is recommended to place two mercury or water-gauges, one near the blast pipe, the other near the governor of the blowing-machine. By varying the pressure, and the diameter of the nozzle of the blast-pipe, making the latter smaller as the former is increased, and *vice versa*, the best proportion is to be ascertained.—[Annales des Mines, vol. vii.] G.

NEW CODE OF NIGHT SIGNALS ON STEAMBOATS.

A new plan of signal lights for steamboats, to enable them to pass each other with safety at night, the invention of Captain W. D. Evens, of H. M. Packet Vixen, has recently been adopted in the Milford post office packets. Nautical men say, that it is the most efficacious of any of the many schemes hitherto proposed to prevent, or at least, to diminish the number of fatal accidents which occur by steamboats at night. It consists in placing a red light on the starboard bow, and a blue light on the larboard bow, with a common light on the fore-mast head. The effect of these lights, so placed, is to indicate immediately, to an observer, in the darkest night, the direction in which the vessel exhibiting them may be steering—which we understand, is all that is required generally to ensure safety; for it appears that most of the unfortunate accidents, which have occurred by steamboats running foul of each other in the night, were caused by each being ignorant of the others course. And, therefore, it is much to be regretted, that so simple and excellent a plan as this, has not long since been in operation;—by which many of those collissions so fatal to life and property might have been averted.

[Cork Standard.]

ST. PETERSBURG.—Within the three last years, this capital has extended itself greatly. New streets have been erected in various directions, in parts which were formerly quite beyond the boundaries of the city; and numerous other improvements are in the course of taking place; one of which is to convey an abundant supply of water from the Neva to all parts of the town. The works of the St. Isaac's Church are now proceeding with great rapidity, no fewer than three thousand men being employed on them daily during the present summer. Of the twenty-four granite columns (each of a single piece, 42 feet high) which are to adorn the exterior of the dome, fifteen are already erected, and the remaining nine have been prepared at the quarries. At present, the forest of scaffolding which surrounds the edifice renders it impossible to judge precisely what the effect will be; yet there is little risk in predicting that, when completed, it will prove the most stupendous architectural monument of modern times; not, indeed, altogether the rival of St. Peter's at Rome, as far as

depends upon actual dimensions alone, but eclipsing it both in splendor of materials and in grandeur of style.—[Archit. Mag.]

The General Architectural Improvement of London.—We are happy to see that this subject is attracting the attention of Parliament; Mr. Alderman Wood has obtained a select committee to consider the propriety of a new street from Southwark Bridge to the Bank of England; another from Waterloo Bridge to the New Road; a third, from Lothbury to the Post Office; a fourth, from the Post Office to Smithfield; a fifth, from Holborn to the Strand; a sixth, through Southwark; a seventh, from St. Paul's to Blackfriars' Bridge; an eigth, from Oxford Street southwards; and a ninth, from Westminster Abbey to Belgrave Square. Sir Robert Peel hoped that an enlarged view would be taken of the subject, and that the house would not fall into the error it had committed with respect to railroads. Perhaps the best mode of proceeding with railroads would have been to appoint competent persons to survey the whole country, and to report upon the most eligible lines; but, though it was now too late to take that course, something of the same kind might be done, with a view to the contemplated improvements of the metropolis; and, before money of any kind were expended, some foresight ought to be used as to the future extension of London. If commissioners could be found, in whom the public would have confidence, for a rational and comprehensive plan, it would be a subject of much congratulation.—[Ibid.]

In Russia, during 1834, there were published 844 works, 728 of which were originals, and 116 translations. These last form about one-eighth of the whole, whereas, in 1833, the translations amounted to a sixth, and in 1831 to a fifth. The number of scientific works was 430, of which 359 were originals. Works purely literary were 271, and of these 226 were original. Of the whole amount 544 were in the Russian language, 91 in the German, 54 Hebrew, 46 Latin, 37 Polish, 36 French, 26 Lithuanian, Ethonian, Finlandish, and Swedish, 3 Italian, 3 Greek, 3 Samogitian, 1 Dutch, 1 English, 1 Arabic, and 1 Persian. At no period was the press of Russia more actively employed than it is at this moment.

Strong Metaphor.—Two brothers recently from the old country, via Halifax, were lately walking up the Worcester Railroad, and their curiosity was some what astonished by the iron tracks, but soon the cars hove in sight, and the following dialogue took place:

Michael.—Och brither; d'ye see that quare cr-crachure a coming?

Patrick.—Troth an' I do. What, in the divil and his grandmother does it mane?

Michael.—Faith, an' it's not me that is to tell ye, but dont an'ye stand out of the way, ye'll learn quite satisfactorily, I'm thinking. Don't ye min' how hard he brathes—he must have been running right tightly for a long space.—[*The car whizz'd by.*]

Patrick.—Och, Mike, we're completely lost; for by my mother's milk, *it is Hell in harness*, and just the sort of coach I once dreamt the ould divil took the morning air in!

Agriculture, &c.

HAY FROM SCOTLAND.

An English paper says—"It forms a curious item of the agricultural commerce of this country, that we are now exporting hay to America. A vessel i about to sail with a cargo of 10,000 store of hay from Aberdeen, and a larger will follow from Clyde. The hay is pressed by the hydraulic press, and the bulk has been thus reduced [sufficiently] for transportation."

The hay thus spoken of has reached this country and finds a quick sale at from 22 to 25 dollars a ton, principally at Boston. If Great Britain, with nearly three times as many horses, cattle and sheep, in proportion to its population, as are owned in the United States, is not only able to provide for their wants, but furnish large supplies of hay for exportation, it proves that England is far ahead of us in productive farming, and that we ought to mend our agriculture at once. It is the *cultivation of roots*, that enables English farmers to keep so many cattle, and spare us their surplus hay; and American farmers must follow the example, or fail of their profits and success. It is surprising with what tenacity our farmers cling to old usages; and persist in mowing ten acres of land to get fifteen or twenty tops of hay, when two acres of roots will furnish more and far superior food. There is hardly a crop produced, more certain than the ruta baga, unless attempted on soils decidedly unfavorable, and their excellence has been fully tested for feeding and fattening cattle and sheep; yet not one half our farmers can be induced to attempt the culture of the root. It is satisfactory to know, however, that the root culture is gaining ground.

SKINLESS OATE.

Extract of a letter to the Editor of the Genesee Farmer at Drummondville, U. C.:—I am glad to have the opportunity of requesting you to call upon such of your subscribers as have cultivated the skinless oats, since 1834, to communicate through your publication what has been the result. In the Genesee Farmer for July and October, 1834, very encouraging accounts are given of the culture of this grain; but I regret to state that my experience has not been so favorable. I sowed last spring upon about a quarter of an acre, seed which had been carefully picked by hand, and in which, consequently, there was no mixture. The growth was vigorous, and as stated by Mr Thorp, (Oct.) the oats ripened earlier than the common oat; but on thrashing, the return was not above half a bushel; though the land had been well manured the preceding spring for corn and potatoes, and the rest of the field yielded at the rate of 34 bushels per acre of barley, of the first quality produced in this neighborhood.

"I have seen somewhere in the Genesee Farmer, a statement of one thousand bushels [of what?*] produced from one acre. Is this well authenticated? Few people will believe it. I had, in 1835, a produce of 300 bushels per acre; last year only 200, under the same favorable circumstances as to manure and cultivation."

* If the writer alludes to Ruta Baga, we have no doubt but 1000 bushels, and more, have been raised on an acre.

From Loudon's Gardener's Magazine.

VITALITY OF SEEDS.

It will be in the recollection of our readers, that, in October, 1834, we published some interesting details of the opening of a British tumulus, near Maiden Castle, by Mr. Maclean, who found therein a human skeleton, and a portion of the contents of the stomach, containing a mass of small seeds, which neither the operation of the gastric juices, nor the lapse of probably twenty centuries, had sufficed to destroy. Many of these seeds have been subjected to various careful experiments, to ascertain whether the vital principle was extinct; and we have the satisfaction of announcing that Professor Lindley has happily succeeded in producing plants from several of these seeds. These plants have confirmed the opinion expressed by the learned professor, on a first inspection of the seeds, that they were those of the rubus idæus, the common raspberry. The plants are now very vigorous, have produced much fine fruit this season, and form an object of the greatest curiosity and attraction to horticulturists. This highly interesting circumstance proves the raspberry to be an indigenous plant in this country, growing at a very early period, and then constituting an article of food. (*Dorset Chronicle*, as quoted in the *Bath Journal*, of Sept. 12, 1836.) We have seen the raspberry plant alluded to in the Horticultural Society's garden The facts are extremely interesting; and we hope Dr. Lindley will compare this case with others of the kind upon record and favor the world with a memoir on the subject.

For the New-York Farmer.

Black Fly.—Sow a bushel of dry ashes to the acre on your turnip field as well as all other vegetables of the same class while the dew is on (or are moist) when they are two or three days old, and it will preserve them against the small black fly, should there come rain to wash it off immediately, repeat it, the ashes also is highly beneficial to promote the growth of the young plant. Oftentimes the black fly will take every vestage from the fields and lead a person who did not see his field during the first few days to believe the field bad, and attribute the evil to that cause. Many farmers are well acquainted with the above facts, but they are not generally known—and this may be of service.

A New-England Farmer.

From the New-England Farmer.

THIRD ANNUAL REPORT OF THE MANAGERS OF THE BOSTON ASYLUM AND FARM SCHOOL.

The managers of the above institution respectfully submit to the corporation the following report:—

The present board of managers was elected in the month of June last, and this report commences with that period.

The objects of the institution are presumed to be well understood. To rescue from the ills and the temptations of poverty and neglect, those who have been left without a parent's care; to reclaim from moral exposure those who are treading the paths of danger; to "place the solitary in families;" to give to those who know nothing of the ties or influence of home, some taste and fondness for a local habitation, at the least; and to offer to those, whose only training would otherwise have been in the walks of vice, if not of crime, the greatest blessing which New-England can bestow upon her most favored sons, a good education, are some of the purposes for which the Asylum and Farm School was endowed. Under the blessing of God, success has thus far attended the exertions which have been made to accomplish these objects. From the monthly reports of the superintendent, and from the personal examination of the establishment on Thompson's Island, the board of managers are satisfied that there has been much improvement in the character of the boys who have been committed to the charge of the institution. In the last report of the superintendent, 62 boys are placed in the highest or first grade, 40 in the second, 4 in the third, and 1 in the fourth.

The number of boys on the island at the time of the last report, was 92; since that time 18 boys have been admitted, and three withdrawn. The number on the 1st of January, 1837, was 107; all of whom, as well as all other persons connected with the establishment on the island, were in good health, and there has been no death at the institution since the last report was made. The occupations and employment of the boys vary with the season. In spring, summer and autumn, the larger boys, in classes, work upon the garden and farm, of whose labor they perform a large part. The younger boys have small gardens of their own, which afford them recreation when released from school. In the winter season most of them attend school, where they are instructed in the learning usually taught in our common schools, and some of them assist in making clothes and mending shoes. The winter evenings are occupied with the study of geography, and the use of globes; botany, and practical agriculture; lecturing on different subjects, singing and reading.—The superintendent states that "every boy in the institution is required to be present during the evening exercises, if he is able, which are very pleasing to them, and which we all enjoy very much."

A large number of mulberry trees have been planted upon the island, and there are many silk worms at the establishment. It is contemplated to improve the advantages of the location in the production of raw silk for manufacture.

As to the success of the boys in the farming operations, Capt. Chandler, the superintendent, says, "they have succeeded far beyond my expectations; I think they have done more work, and done it better, than the boys of their age who have been regularly brought up to the business in the country generally do." And as to the comfort and contentedness of the boys, he says, "they are all comfortably clad with woollen clothes, shoes, stockings and caps, and appear to be as happy in their present situation as boys generally are under the paternal roof. They appreciate their advantages, and most of them are grateful to the benefactors of the institution and their friends for placing them here. The boys are well supplied with books, and keep them in excellent order; our library contains between 4 and 500 volumns of well selected books. I have also an agricultural library containing about 30 volumns, to which the boys have access."

Opportunities are occasionally offered to the friends of the boys at the institution, of visiting them on the island in the summer months.

The school is under the immediate charge of Mr. George B. Hyde, and he as well as the superintendent and all engaged in the establishment, are believed to merit the continuance of the confidence which has hitherto been reposed in them.

During the past summer, several parties of ladies and gentlemen, at the request of the board of managers, visited Thompson's Island. At these visits there have been many persons present, and an examination of the boys in their different studies has been accompanied by some remarks on the objects and prospects of the institution.—Among these who have thus visited the island, have been many strangers, who have always expressed their interest and pleasure in its objects and condition.

And how should it be otherwise than an object of interest; an institution designed to rescue the desutute orphan boys of our city from vice and ruin; to withdraw them from scenes and associates, whose contaminating influence would quickly destroy the perceptions of conscience, and leave them, deprived of that monitor, to pursue the impulses of passions which inevitably destroy their victims. Many are the worthy objects of the charitable institutions among us; our hospitals relieve the sufferings of the sick, and restore them to health and usefulness; they are a blessing which may be required by all of us, and we would not detract from their deserts. But we conceive that an institution which is to rescue immortal beings from the stain of sin, which could hardly otherwise be avoided, which is intended to have an influence on the youthful mind, and lead it to an understanding of its own capacities, responsibilities and hopes, deserves the fostering care of an enlightened, benevolent community, as much as those associations whose aim is to cure the diseases of the body, or to restore the wanderings of intellect. Such an institution as the Asylum and Farm School, is in true accordance with the spirit of the pilgrims; it carries into effect the first objects of their solicitude, the education of the young—of that young whose talents would otherwise be employed to violate the peace and virtue of society.

It will be seen by the report of the finance committee, that the expenses of the institution for the year ending January 1, 1837, have amounted to $6,100, while the receipts for the same time have amounted to 3,500, leaving a deficiency of $2,600. To meet this excess of expenditure over income, and to prevent its recurrence, it will be necessary to appeal to the liberality of the public. The board of managers had intended to have made that appeal in the autumn of the past year; but the condition of the financial affairs of this community induced them to defer it. They would recommend the subject to their successors as one requiring their attention when a suitable time shall have arrived for its execution, with the confidence that the appeal will be cheerfully and promptly answered.

For the managers.

WILLIAM GRAY.

COMMERCE OF OSWEGO.

The following statement shows the amount of Merchandize transported on the Erie and Oswego canals, for lake Ontario and the Upper Lakes through the Port of Oswego, by the forwarders of this village, during the gear 1836:

Forwarders.	*Tons for lake Ontario.*	*Tons for Upper Lakes.*	*Total.*
Bronson & Crocker,	2,556$\frac{3}{4}$	935$\frac{1}{2}$	3,492$\frac{1}{4}$
Henry Fitzhugh,	1,939$\frac{1}{4}$	940	2,879$\frac{1}{4}$
Trowbridge & Grant,	1,324	1,884$\frac{1}{2}$	3,208$\frac{1}{2}$
Charles Smith, Jr.	683$\frac{1}{4}$	3,321$\frac{1}{2}$	4,004$\frac{3}{4}$
Tons,	5,503	7,080$\frac{1}{2}$	13,584$\frac{3}{4}$

82,339 barrels of Salt were shipped by the three first named houses above, to ports on lake Ontario and the Upper Lakes.

In relation to the trade of the Upper Lakes, it should be borne in mind that of the 183 days from the opening to the close of navigation on the Welland Canal, it was only in condition for use 92 days. Our forwarders are generally refused goods in New York in September and October, and large amounts of merchandise destined for this route went to Buffalo, with the principal part of the tonnage of Lake Ontario, to transport them, owing to the uncertain state of the Welland Canal. The Canadian government have now taken this canal, and it is announced that it will be navigable on the 15th April next.

STATEMENT of articles shipped from Oswego, by the Oswego canal to the Erie canal, during the season of 1836.

Wheat, bushels,	112,224
Flour, barrels,	94,667
Corn and Rye, bushels,	26,005

Other grain, "	51,726
Bran and ship stuff, "	74,002
Pork (principally from Ohio,)	5,864
Beef, barrels,	390
Ashes, casks,	7,467
Domestic spirits, casks,	2,063
Boards and Scantling, feet,	8,390,998
Square timber, cubic feet,	102,122
Shingles, bunches,	489
Staves, pieces,	541,823
Wood, cords,	1,412
Clover and Grass seed, lbs,	46,040
Flax seed, "	1,200
Cheese, "	1,456,640
Butter and Lard, "	644,256
Tobacco, (from Ohio,) "	242,160
Wool, "	62,996
Domestic cottons manufactured,	60,099
Ditto Woollens, "	8,926
Merchandise, "	805,378
Leather, lbs,	19,035
Furs, "	10,000
Peltrie, "	49,300
Furniture, "	354,366
Lead ore, (from St. Lawrence,)	650,112
Pig Iron, lbs,	1,274,135
Iron Ware, "	52,226
Stone, lard, and articles without designation, Tallow, Bacon, &c. &c.	5,897,831

Statement of sundry articles coming from places out of the State and shipped by the Erie canal in the year 1836, taken from the collector's books:

Staves, pieces,	530,823
Flour, barrels,	9,441
Wheat, bushels,	60,384
Corn,	17,286
Barley,	35,424
Other grain,	11,950
Pork, barrels,	831
Beef, "	390
Ashes, "	189
Grind stones, lbs,	78,983
Tallow, "	30,023
Bacon, "	151,462
Tobacco, "	188,2[illegible]6
Clover and Grass seed,	29,505
Flax seed,	1,200
Butter and lard,	37,266
Furs,	4,060
Peltrie,	13,972
Merchandise,	18,893
Furniture,	7,832

LIST OF SUBSCRIBERS to the **Railroad Journal**, that have paid, (continued.)

Dr. McNeven, city New-York, 1st Jan. 1838
M. Delano, Camillus, N. Y. 1st Jan. 1838
D. Hurd, Royalton, N. Y. 1st Aug. 1838
W. D. Wallack, Portsmouth, Va. 1st Jan, 1838
S. Bowman, Bowmans Mills, Va. 1st Jan. 1838
J. D. Steele, Baltimore, Md. 1st Sept. 1837
G. F. De La Roche, Baltimore, Md. 1st Dec. 1837
Col. Jas. G. Totten, Newport, R. I. 1st Jan. 1838
Beaver Meadow R. R. and Coal Company. Beaver Meadow, Penn. 1st Jan. 1838
Lt. J. M. Berrian, Detroit, Michi. 10th Feb. 1838

PHILADELPHIA STOCK MARKET.

April 7th

	Price of shares	Offered	Asked
RAILROAD STOCKS			
New-Castle and Frenchtown	25	30	31½
Do loan, 5½ per cent	100	99	101
Wilmington and Susquehanna	50	33	36
Camden and Amboy, shares,	100	130	131
Do loan, 6's 1836	100	110	120
Danville and P shares	50	25	35
Norristown, do	50	21	25
Do 6 per cent loan	100	85	100
Valley Railroad	7½	1	3
Westchester do	50	20	28
Minehill do	50	57	59
N. L. and Penn. Tp. do	40	34½	35
Philadelphia and Trenton do	100	118	120
West Philadelphia Railroad	50	20	30
Harrisburg and Lancaster	50	46	48
Cumberland	25	15	20
Beaver Meadow	50	52	53
MISCELLANEOUS STOCKS			
North American Coal Company	25	12	14
Steam Bt. Sts. Columbian	100	18	22
Exchange Stock	100	70	80
Arcade	100	55	75
Theatres—Chestnut street	600	625	675
———Walnut street	280	175	220
———Arch street	500	325	375
Gas Company	100	95	100
CANAL STOCKS			
Schuylkill Navigation, shares	50	156	158
Do loans, 5 1845	100	98	100
Do do 1855	100	100	101
Do do 5½ 1837	100	98	100
Lehigh Coal and Navigation	50	79	79½
Do loan, 6 1833	100	97	98
Do do 6 1839	100	97	9[illegible]
Do do 6 1844	100	99	100
Do do 5 1840	100	96	97½
Union Canal, shares	200	180	190
Do loan, 1836	100	83	86
Do do 1840	100	85	90
Chesap'k & Delaware Canal, shares	200	20	40
Do loan, 1837	100	60	67
Do do 1840	100	60	67
Delaware and Hudson,	100	71½	72½
Do loan	100	95	100
Louisville and Portland	100	100	110
Convertible 6 per cent. loans,	100	100	110
Sandy and Bever	100	60	80
Morris Canal	100	75	78